WEATHER, FORECASTS AND WARNINGS.

By H. C. FRANKENFIELD, Professor of Meteorology.

NORTHERN HEMISPHERE PRESSURE.

As a rule moderately low pressure prevailed over Asia during the greater portion of the month without any unusual features. The single instance of decided recovery toward high pressure occurred during the third decade of the month, when an extensive high area from northern and central Russia overspread Siberia and China. Temperatures were in keeping with the pressure, and no unusual extremes occurred, the average thermometer readings for the month from reporting stations at the time of observation ranging approximately from zero to about −40° F. Over the Pacific Ocean pressure was high during the first half of the month, abnormally so over the north Pacific, and correspondingly low during the second half. There were two great crests at Dutch Harbor, one of 30.48 inches on the 7th, and one of 30.62 inches on the 13th, and one great depression of 28.54 inches on the 29th. Pressure over Alaska corresponded in a general way with that over the Aleutians, except that at the time of the great depression over Dutch Harbor on the 29th, the pressure was moderately high over Alaska. Temperatures over Alaska were lowest during the second half of the month (lowest reported, −48°) notwithstanding the prevailing low pressure, and highest during the first half notwithstanding the prevailing high pressure. On the first day of the month, however, a temperature of −50° was reported at Eagle, but with pressure below normal.

Over the United States pressure conditions corresponded roughly, but in modified form as a rule, with those over Alaska. With the single marked exception of the abnormally low pressure over the Atlantic States during the early days of the month, the low areas were mostly of a single type having long and narrow troughs north and south, with much precipitation in the central valleys and high eastern temperatures, a condition for which the persistent middle-west Atlantic Ocean high area was responsible. The Atlantic high area as indicated by the reports from Bermuda and Turks Island prevailed with insignificant interruptions throughout the month, and on the morning of the 6th the barometer at Hamilton, Bermuda read 30.70 inches. Over the eastern Atlantic pressure was variable, as indicated by the barometer readings at Horta, but with a tendency to below normal readings, except during the last few days of the month. High pressure prevailed over Iceland from the 21st to the 27th, but, with this exception, pressure was generally low over that region and western Europe with frequent rains, and severe storms at times. This condition, combined with the general pressure distribution westward over the Atlantic Ocean, caused a series of heavy gales over the north Atlantic that is said to be without precedent. At 6 p. m., January 9th, the steamship *Cedric*, while in latitude 46° 5′ N. and longitude 42° 40′ W., reported a barometer reading of 27.49 inches, with northwest winds of hurricane force. Marine casualties were numerous during the month, but, fortunately, with a single exception, none was of grave character. Over continental Europe, except the southwestern portion, pressure distribution was largely similar to that over the Pacific area and Alaska. There were no abnormal departures, except an extensive high area over northern Russia from the 8th to the 15th, inclusive, and a decided low area over central Russia from the 25th to 28th, inclusive. Over southwestern Europe low pressure was the rule, with marked depressions on the 17th, 21st, and 31st, all being parts of the extensive depression to the northward, and all extending northeastward over Germany.

WEATHER IN THE UNITED STATES.

The month was remarkable for the persistence of high pressure over the western Atlantic Ocean with the result that the temperatures were above the normal over the entire central and eastern portions of the country. Over the Atlantic Coast States the month as a whole was with but a single exception the warmest of record, with a preponderance of cloudy and rainy days. The records of Washington, D. C., cover a period of nearly 100 years, and but once during that period (in 1890) has the mean temperature for January exceeded that of the present month, and then only by two-tenths of a degree, while at Philadelphia, Pa., the month was the warmest in the record of 123 years.

At the beginning of the month a depression of fair proportions was central over Manitoba, with a high area of moderate strength over the Rocky Mountains. Temperatures were high and precipitation was unimportant except along the Atlantic Coast. By the evening of the 1st the northwestern depression had moved to Lake Superior and a secondary one had formed over northeastern Texas, so that a narrow trough extended from that locality to Lake Superior. There was no precipitation to the eastward, but westward to the mountains there were light local snows, accompanied by lower temperatures and rapidly rising pressure with a strong crest over southern Idaho. There had also been a rapid rise in pressure to the eastward of the narrow trough. On the evening of the 2d the low-pressure trough extended from Alabama to Georgian Bay and the barometer had fallen decidedly to the eastward, with rapidly rising temperature from the eastern Gulf of Mexico northward, and with rains south of the Ohio River and rains and snows to the northward. Pressure had also fallen considerably over the West and Northwest with a decided rise in temperature over the latter district, but with a fall to nearly normal conditions over the upper Lake region, the central valleys, and the Southwest. Storm warnings were at once ordered for the south Atlantic and east Gulf coasts and during the ensuing 12 hours there was a fall in pressure over the

Atlantic States that was unprecedented in respect to rapidity and extent. The barometer read 28.90 inches over Virginia, a fall of nearly 1 inch in 12 hours and, except over the east Gulf States, there was also a fall westward to the Pacific Ocean, especially over the western slope of the northern Rocky Mountains. General rains were in progress east of the Mississippi River, with some snow north of the Ohio River, and temperature had fallen to somewhat below normal conditions from the Gulf States northward and had risen decidedly over the Plains States, the Rocky Mountain region, and the Northwest. Winds had become high over the South and they were increasing to the northward, and the storm warnings were soon extended to Eastport, Me. The pressure continued to fall as the storm center moved northward, and by the evening of the 3d the barometer at Montreal, Canada, read 28.24 inches, a fall of 1.06 inches in 12 hours, and of 1.52 inches in 24 hours. The barometer was below 29 inches as far west as the Pennsylvania-Ohio line and the readings were the lowest of record over the eastern lower Lake region, the Middle Atlantic States, and New England. Rains and snows, severe local storms, and dangerous gales had occurred over the East, and temperatures had fallen considerably although not to low readings, east of the Mississippi River, except in New England. The gales were especially severe, with wind velocities ranging from 50 to 88 miles an hour from the south and southwest from North Carolina northward, and much damage was caused both on land and sea. During the development and passage of this storm another disturbance had developed west of the Rocky Mountains and by the evening of the 4th it was central over northeastern Arizona, with a barometer reading of 29.18 inches at Flagstaff. The general depression extended eastward over the lower Ohio Valley and the west Gulf States, and snow was falling over the extreme central West. Pressure was rising rapidly to the westward and northwestward, accompanied by a decided fall in temperature and by high winds on the California coast for which warnings had previously been ordered. Cold-wave warnings had also been ordered for the Northwest, the extreme central West, and the Southwest. On the morning of the 5th the principal disturbance was central over southwestern Colorado, but a secondary trough had formed over eastern Texas, and snows and rains were falling over the central portion of the country from the Ohio Valley to Colorado. There was a great rise in temperature throughout the South and an equally great fall to typical winter conditions over the West and Northwest. At Havre, Mont., the thermometer read 32° below zero, and the line of zero temperature extended into northeastern Colorado.

Killing frost warnings were ordered for California and cold-wave warnings for the west Gulf States and the Southwest. By the morning of the 6th the low pressure trough had filled considerably, but was still definitely marked from the Texas coast to extreme western Ontario. Snows and rains had fallen generally throughout the Great Basin of the country, and temperatures were unseasonably high east of the Mississippi River and abnormally low westward to the Pacific Ocean. The temperature in north-central Montana fell to 36° below zero, and the line of zero temperature extended into the Texas Panhandle. Freezing temperatures occurred throughout California and over portions of southern California the temperatures were the lowest of record and continued for three days, resulting in losses to the fruit industry that will probably amount to $20,000,000 or more. In the meantime the northern portion of the low pressure trough over the East had entirely disappeared, but the southern portion persisted and began to move northeastward with increasing intensity. General snows and rains continued over the eastern half of the country and in the Southwest, and it was not until the morning of the 9th that the disturbance, now a severe storm, passed off the Newfoundland coast with a barometer reading of 29.10 inches at St. Johns. The weather had cleared east of the Rocky Mountains, and low temperatures prevailed throughout the country, notwithstanding the fact that pressure was again low west of the Rocky Mountains and over the northern Plains States. On the evening of the 7th storm warnings were ordered for the New England coast, and high winds occurred on the following day. Following the passage of the storm cold-wave warnings were ordered on the 5th for the Central West, on the 6th for the west Gulf States, and on the 7th for portions of the east Gulf States and the Northeast. The warnings were not fully verified east of the Mississippi River so far as minimum temperatures were concerned, although the fall amounted to more than 40° in many localities. The heavy, warm rains of the 6th and 7th caused a severe flood in the Ohio River and some of its tributaries, and at Cincinnati the crest stage exceeded 62 feet. Detailed reports of these floods will be found in another portion of this review. On the morning of the 7th a disturbance of pronounced character was central over extreme southern Alaska and storm warnings were ordered on the north Pacific coast. By the morning of the 8th the storm had reached the Washington coast, after which it moved eastward over the Canadian Northwest, reaching Manitoba on the morning of the 9th, by which time a secondary depression had developed over the middle plateau. The gales resulting from this storm were unusually severe and a wind velocity of 72 miles an hour from the south was reported at Tatoosh Island, Wash. During the gale the steamship *Rosecrans* ran aground while endeavoring to enter the Columbia River and was lost, together with 33 of her crew of 36 men. The storm was also very severe over the interior of the North Pacific States, and heavy drifting snows demoralized traffic in the Cascade Mountains. Following the usual procedure of this type of pressure distribution, the northern disturbance continued eastward as a dry low and passed out of the Gulf of St. Lawrence during the 10th. The plateau low was attended by rains and snows, and pressure remained low on the north Pacific coast until the night of the 9th.

On the evening of the 10th an irregular low area covered Colorado, with a narrow arm extending therefrom into southeastern Minnesota, with rapidly rising pressure, local snows, and low temperatures to the northwestward, for which cold-wave warnings had been ordered on the 8th and 9th. Temperatures were again high over the East and South and rains were falling, except in the Middle Atlantic States and New England, the barometer remaining high in the Atlantic States and the adjacent ocean, a distribution similar to that of the preceding storm. By the evening of the 11th, the depression extended in trough shape from the Ohio Valley to northern Ontario with increasing energy, and general rains with high temperature continued over the Ohio Valley and the East and South, while to the northward the weather was clear and decidedly colder with high pressure. The warm and comparatively light southerly winds caused a dense fog during the 11th along the

middle Atlantic and southern New England coasts, with consequent inconvenience and menace to shipping, although casualties were few and unimportant. On the 10th cold-wave warnings were ordered for Nebraska and portions of the Northwest, and on the 11th for the Southwest generally, the west Gulf States, the great central valleys, and southern Wisconsin. The storm continued eastward with its southern end contracting and the northern one increasing in energy, and on the morning of the 12th storm warnings were ordered on the Atlantic coast from Eastport, Me., to Hatteras, N. C., and cold-wave warnings over the East and South generally, except Florida. During the night of the 12th the storm passed off the Newfoundland coast, and on the morning of the 13th high pressure and generally clear weather prevailed east of the Rocky Mountains. A cold wave also covered the East and South, and low temperatures continued in the West, but with marked moderation over the Missouri and upper Mississippi Valleys. During the 11th another disturbance appeared on the north Pacific coast, and storm warnings were ordered early in the morning. It was attended by rains in the north Pacific States, and an offshoot moved eastward to Wyoming, where it disappeared, pressure remaining high to the southward and rising rapidly to the northward, while at the same time the original depression persisted on the north Pacific coast with renewed activity. Pressure continued abnormally high east of the Rocky Mountains with one crest over New England and another over the lower Missouri Valley, and generally clear weather prevailed with moderate temperatures. Rains set in throughout the Pacific States and snows in the extreme northwest. The depression spread slowly to the eastward and southward, but with the original low persisting on the north Pacific coast. The center of depression moved to southeastern Wyoming, where it disappeared after sending to the northeastward an insignificant arm that moved rapidly over Canada to the Gulf of St. Lawrence. Storm warnings were again ordered on the north Pacific coast on the evening of the 14th, and the low-pressure area on the Washington coast persisted with rains in the Pacific States. While the pressure remained low, the fluctuations were frequent and at times decided, and now and then an offshoot would move eastward, leaving the original depression still intact. On the morning of the 16th there was a well-defined disturbance central over northwestern Wyoming, with pressure rising to the northward. Pressure was still abnormally high over the Atlantic Ocean and the Southeast, and as a consequence warm rains were falling from the Ohio Valley eastward. The disturbance moved rapidly, with increasing intensity, eastward to western Lake Superior by way of southern Minnesota, and by the night of the 17th it was somewhere to the northward of the lower St. Lawrence Valley, with pressure rising rapidly from the upper Lake region and the upper Mississippi Valley westward. During the 17th, however, another disturbing element was introduced through the development of a depression over southwestern Illinois. This storm moved northeastward with increasing energy, causing a continuance of the general rains and high temperatures over the East and South, and some snows over the upper Lake region, and it finally passed off the Canadian coast on the morning of the 22d. Following the passage of the low area of the 16th and 17th, cold-wave warnings were ordered on the 16th for portions of the Northwest, including northern Iowa, and by the morning of the 17th there was a decided fall in temperature between the Mississippi River and the Rocky Mountains, with readings between zero and 20° below over the Northwest.

After the passing of the storm of the 17th, it also became considerably colder over the eastern portion of the country, but there was merely a temporary return to normal conditions, as the middle Atlantic high-pressure area still stood as a bar to any extensive movement from the interior. During these changes to the eastward, pressure had remained low over the Pacific Northwest, and on the night of the 16th a narrow trough of barometric depression extended down both slopes of the Rocky Mountains into Colorado, just as the storm immediately preceding had reached Lake Superior. Rains and snows were falling west of the mountains, and pressure was rising rapidly in the rear of the depression, which disappeared entirely during the next 12 hours, with the exception of the northern portion which still persisted over Washington with renewed vigor. It may be remarked in passing that the southern portion of this disturbance and the one that appeared over Illinois on the evening of the 17th were perhaps identical, but, if so, the connection was not apparent on the weather chart. The north Pacific storm became severe during the night of the 17th and on the morning of the 18th was central over western Montana with the low barometer reading of 29.24 inches. Storm warnings had been ordered on the previous day, and severe gales with snow occurred generally. Warnings were also ordered for the California coast on the 18th. The disturbance continued eastward and by the time it had reached the central portion of the country it had assumed the narrow north and south formation characteristic of the depressions of this month, and extended from northern Texas northeastward to Lake Superior. This was on the evening of the 19th, and marked high pressure prevailed on both sides, but thus far there had been no precipitation of consequence east of the Rocky Mountains. Temperatures, however, had risen to much above normal conditions throughout the low area and the districts immediately adjoining. To the northwestward and westward there had been a great rise in pressure accompanied by a cold wave, for which warnings had been issued on the previous day. Warnings were also issued for the upper Lake region and the central West. By the morning of the 20th the disturbance extended from northeastern Texas to Lake Huron and general rains and snows were falling over this area, with abnormally high temperatures in the Lake region, the Ohio Valley, and the South. Storm warnings were then ordered on the Atlantic coast from Norfolk northward and high winds occurred generally during the following 24 hours. The high area followed closely and cold wave warnings were ordered for the Ohio Valley, Tennessee, and northern Mississippi. By the morning of the 21st the storm center had contracted materially and was over the State of Maine. Rains and snows had been general east of the Mississippi River and the high-pressure area with the cold was nearing the Allegheny Mountains. During the 21st the storm passed out into the North Atlantic and the weather had cleared and temperatures had fallen materially to the coast line.

As had been indicated in the weekly forecast issued on the 19th, the cold wave was not severe over the eastern portion of the country, as the high area over the western Atlantic Ocean still barred the way to any uninterrupted transfer of the cold air from the West. On the morning of the 20th pressure was abnormally low over southern Alaska and was falling rapidly over Alberta and the

north Pacific coast, and by the evening there was a well-defined disturbance central just over the northern Montana line. Temperatures were rising rapidly but there was no precipitation as yet except a little snow and rain in western Montana and in Washington. On the morning of the 21st the depression extended in irregular form from southern Alberta to western Minnesota, with a center of circulation at each end. The forward end continued rapidly eastward without incident, as high pressure persisted over the eastern and southern portions of the country. The western center finally moved southeastward, attended by local snows and rains that became general when, on the morning of the 23d, another southwest-northeast trough extended from northern Texas to Lake Superior, with snows and rains falling to the eastward almost to the coast. Storm warnings were then ordered from Hatteras to Eastport. By the morning of the 24th the northern end of the trough had passed into the Gulf of St. Lawrence, but slight secondary disturbances persisted over Virginia and the lower Mississippi Valley, with local rains still falling. High pressure persisted as usual over the western Atlantic, but, although there was a decided fall in temperature, there was no pressure rise of consequence over the interior, and unsettled weather with occasional light rains continued in the Middle and South Atlantic States until the morning of the 25th, by which time another pronounced low had appeared over the Northwest, coming apparently as another offshoot from the low that still persisted over southern Alaska. Storm warnings for this disturbance had been ordered on the north Pacific coast on the 23d. It moved almost due eastward, attended by a little precipitation over the northern tier of States, but with increasing intensity, and by the evening of the 26th had reached the upper St. Lawrence Valley. On the morning of the 26th a slight depression was noted over southeastern Texas, and by the evening it had reached the mouth of the Mississippi River with much increased development, and storm warnings were ordered on the middle Gulf coast and advisory warnings sent to south Atlantic coast stations. On the morning of the 27th a trough of low pressure extended from Georgia to New Brunswick with strongly defined centers at each extremity and rains were falling throughout this area with a heavy fall in the South, necessitating flood warnings for the rivers of that section. Storm warnings were at once ordered along the Atlantic coast, and moderately high winds occurred along the middle and south coasts. The recovery in pressure following this disturbance was of very brief duration, but there was a moderate cold wave over the central portion of the country for which warnings were ordered on the 26th. The disturbance passed into the Atlantic during the night of the 27th, but at the same time another was developing over the middle Mississippi Valley and another over the Canadian Northwest. It should be remarked, however, that since the 23d high pressure had been persistent west of the Rocky Mountains, and this condition continued at the close of the month. The Middle West disturbance moved to the upper Ohio Valley and then disappeared on the night of the 28th after causing moderate snows in the Ohio Valley and western lower Lake region and later in the Middle Atlantic States and New England. The Canadian Northwest disturbance moved east-southeastward and on the morning of the 29th was central over northeastern Minnesota, leaving a secondary center over southeastern Alberta that also moved southeastward, and on the morning of the 30th another trough of low pressure extended from Oklahoma to Wisconsin with no precipitation preceding it, but with quite general snows to the northwestward, where pressure was rising rapidly with a decided fall in temperature. Cold wave warnings were ordered on the 30th for the Northwest and the upper Lake region and extended on the following morning throughout the Northern States generally and into northern Tennessee. Snow and rain began to fall during the 30th over the low-pressure area and by the end of the month the trough of depression had passed into the Atlantic Ocean without much further development, but with general rains and snows over the entire eastern portion of the country with some high winds along the coast, for which warnings were ordered at the proper time. The cold wave following was the most general one of the month, and during the night of the 31st it reached the Atlantic States, with high pressure over the entire country except the extreme Southwest.

Average temperatures and departures from the normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.
New England	12	34.6	+10.2
Middle Atlantic	15	41.7	+10.4
South Atlantic	10	54.7	+ 9.6
Florida Peninsula [1]	9	67.5	+ 8.0
East Gulf	11	54.8	+ 7.4
West Gulf	11	48.4	+ 2.3
Ohio Valley and Tennessee	14	41.6	+ 8.4
Lower Lakes	11	32.7	+ 8.4
Upper Lakes	13	21.5	+ 3.3
North Dakota [1]	9	1.9	− 2.6
Upper Mississippi Valley	14	25.6	+ 4.0
Missouri Valley	12	24.7	+ 3.7
Northern slope	9	17.5	− 1.5
Middle slope	6	30.6	+ 1.5
Southern slope [1]	8	39.7	+ 0.5
Southern Plateau [1]	9	37.2	− 4.6
Middle Plateau [1]	10	21.5	− 3.6
Northern Plateau [1]	10	21.2	− 3.7
North Pacific	7	37.5	− 1.9
Middle Pacific	7	44.4	− 2.9
South Pacific	4	49.0	− 1.9

[1] Regular Weather Bureau and selected cooperative stations.

Average precipitation and departures from the normal.

Districts.	Number of stations.	Average.		Departure.
		Current month.	Percentage of normal.	Current month.
New England	11	3.33	92	−0.30
Middle Atlantic	15	2.84	85	−0.50
South Atlantic	11	2.41	62	−1.50
Florida Peninsula [1]	9	2.25	82	−0.50
East Gulf	11	5.11	102	+0.10
West Gulf	10	3.63	124	+0.70
Ohio Valley and Tennessee	14	8.24	215	+4.40
Lower Lakes	10	5.15	194	+2.50
Upper Lakes	13	1.65	80	−0.40
North Dakota [1]	9	0.52	84	−0.10
Upper Mississippi Valley	15	2.17	123	+0.40
Missouri Valley	12	0.79	80	−0.20
Northern slope	9	1.24	148	+0.40
Middle slope	6	0.41	58	−0.30
Southern slope [1]	8	0.47	48	−0.50
Southern Plateau [1]	9	0.40	50	−0.40
Middle Plateau [1]	11	0.67	63	−0.40
Northern Plateau	10	2.02	125	+0.40
North Pacific	7	7.33	111	+0.70
Middle Pacific	7	4.12	87	−0.60
South Pacific	4	1.98	72	−0.80

[1] Regular Weather Bureau and selected cooperative stations.

Average relative humidity and departure from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	76	0	Missouri Valley	71	− 4
Middle Atlantic	77	+ 1	Northern slope	73	+ 3
South Atlantic	82	+ 5	Middle slope	63	− 4
Florida Peninsula	82	+ 1	Southern slope	62	− 4
East Gulf	82	+ 4	Southern Plateau	60	+10
West Gulf	76	0	Middle Plateau	70	0
Ohio Valley and Tennessee	80	+ 3	Northern Plateau	78	− 2
Lower Lakes	80	− 1	North Pacific	89	+ 4
Upper Lakes	82	− 1	Middle Pacific	76	− 5
North Dakota	86	+ 6	South Pacific	65	− 7
Upper Mississippi Valley	79	+ 1			

Average cloudiness and departure from the normal.

New England	6.5	+0.6	Missouri Valley	4.8	−0.2
Middle Atlantic	6.3	+0.5	Northern slope	6.2	+1.1
South Atlantic	6.2	+0.9	Middle slope	4.2	+0.1
Florida Peninsula	4.0	−0.8	Southern slope	4.4	0.0
East Gulf	6.3	+0.6	Southern Plateau	2.9	−0.5
West Gulf	5.6	+0.3	Middle Plateau	4.3	−0.8
Ohio Valley and Tennessee	7.1	+0.7	Northern Plateau	7.4	+0.7
Lower Lakes	7.7	+0.3	North Pacific	8.2	+0.7
Upper Lakes	7.8	+0.9	Middle Pacific	4.6	−1.0
North Dakota	5.4	+0.5	South Pacific	3.8	−0.7
Upper Mississippi Valley	6.5	+1.1			

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Atlanta, Ga	3	58	sw.	New Haven, Conn	3	53	sw.
Block Island, R. I.	3	65	sw.	New York, N. Y.	3	86	se.
Do	4	70	sw.	Do	4	74	nw.
Do	8	50	nw.	Do	8	64	nw.
Do	12	54	nw.	Do	12	66	nw.
Do	13	50	nw.	Do	18	79	w.
Do	18	60	w.	Do	19	50	nw.
Do	19	57	w.	Do	21	62	nw.
Do	21	54	nw.	Do	31	60	sw.
Buffalo, N. Y.	3	52	w.	Norfolk, Va.	3	64	nw.
Do	4	56	w.	North Head, Wash.	1	62	se.
Do	17	52	sw.	Do	3	66	nw.
Do	18	66	sw.	Do	7	70	s.
Do	23	60	w.	Do	8	56	s.
Do	26	60	sw.	Do	11	76	s.
Do	31	70	w.	Do	13	56	se.
Burlington, Vt.	3	60	s.	Do	15	60	se.
Canton, N. Y.	3	50	e.	Do	20	50	s.
Cheyenne, Wyo.	2	50	nw.	Do	23	60	s.
Do	3	54	nw.	Do	24	52	s.
Cleveland, Ohio	18	60	w.	Pensacola, Fla.	26	60	s.
Columbia, S. C.	3	56	sw.	Philadelphia, Pa.	3	52	s.
Columbus, Ohio	18	58	nw.	Pittsburgh, Pa.	18	58	sw.
Duluth, Minn.	9	56	sw.	Point Reyes Light, Cal.	3	75	nw.
Eastport, Me.	4	50	s.	Do	4	86	nw.
El Paso, Tex.	5	50	sw.	Do	8	59	s.
Hartford, Conn.	3	58	sw.	Do	11	52	s.
Hatteras, N. C.	3	60	w.	Do	12	51	s.
Do	4	63	w.	Do	13	62	s.
Helena, Mont.	2	70	sw.	Do	14	66	s.
Do	25	50	sw.	Do	16	72	s.
Lander, Wyo.	17	64	w.	Do	17	51	s.
Do	18	58	sw.	Do	18	60	s.
Memphis, Tenn.	20	54	nw.	Raleigh, N. C.	3	50	sw.
Mount Tamalpais, Cal.	1	54	nw.	Rapid City, S. Dak.	18	51	w.
Do	3	67	nw.	Richmond, Va.	3	61	sw.
Do	4	67	nw.	Savannah, Ga.	3	58	w.
Do	5	51	n.	Southeast Farallon, Cal.	3	56	nw.
Do	6	52	ne.	Do	4	66	nw.
Do	8	51	sw	Do	5	50	n.
Do	11	52	s.	Do	14	50	s.
Do	12	50	sw.	Do	16	50	sw.
Do	14	52	sw.	Syracuse, N. Y.	4	50	nw.
Do	16	65	sw.	Do	18	50	nw.
Mount Weather, Va.	3	65	w.	Do	20	51	s.
Do	4	60	w.	Do	23	54	s.
Do	8	62	nw.	Tatoosh Island, Wash.	3	56	w.
Do	9	54	nw.	Do	7	52	s.
Do	12	74	nw.	Do	12	58	e.
Do	18	54	w.	Do	20	64	sw.
Do	19	50	nw.	Toledo, Ohio	18	56	w.
Do	21	60	nw.				
Nantucket, Mass.	3	63	sw.				
Do	4	69	sw.				